National Aeronautics and Space Administration

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3 **Robotics Kick-Off Program**

The NASA Wallops Flight Facility will host local high school teams competing in this year's First Robotics Competition (FRC) during the kick-off program from 8:45 a.m. to 2 p.m., Saturday, January 3, at the Wallops Visitor Center. The public is invited to attend.

The FIRST Robotics Competition (FRC) season kicks off as high school students representing Northampton, Accomack, Worcester, and Wicomico County teams learn about the 2015 challenge that will pit them in competition with other students from the mid-Atlantic, to across the nation, and around the world.

What's inside

on the COVER

United States Senator Tim Kaine visited the Wallops Flight Facility.

Photo Credit: NASA/Jamie Adkins

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The Antares ORB-1 rocket launched Jan. 9, 2014, from Wallops Flight Facility. Photo Credit: NASA/Chris Perry

The Director's Cut

Looking ahead, 2015 will be a very special year for Wallops. On June 27, we will celebrate the 70th Anniversary of the first launch from our facility, and we'll mark that occasion with an open house event.

It's going to be huge, and it's going to have to be if it's to eclipse this whirlwind of a year we're wrapping up now. 2014 has been quite a journey. To mark a year chockablock with firsts, records, and other incredible achievements, I present you with this snapshot year-in-review:

January — Making news right at the first of the year, Wallops, as part of a Virginia Tech-led team, is one of six test sites established by the Federal Aviation Administration to integrate unmanned aerial vehicles into the National Air Space system.

On January 9, following a polar vortex and a massive solar weather event, Orbital Sciences launched its Cygnus cargo spacecraft on an Antares rocket for the company's first commercial resupply services mission to the International Space Station.

February — NASA's Global Precipitation Measurement mission launched from the Tanegashima Space Center in Japan the afternoon of Feb. 27. Wallops built the high-gain antenna flying on GPM, and Wallops' Earth Science field support office is responsible for conducting ground validation of GPM's data. In 2015, the team will travel to Washington state to conduct ground validation work.

March — The Ground-to-Rocket Electrodynamics – Electron Correlative Experiment, or GREECE, took flight March 3rd from Poker Flat Research Range in Alaska, flying into the aurora borealis. NASA Wallops is back in Poker Flat in 2015 with five launches planned beginning in January.

April — We celebrated the conclusion of an incredible mission that got its start with a near-perfect ride on a Minotaur V launching from Mid-Atlantic Regional Spaceport Pad 0B at Wallops. The Lunar Atmosphere and Dust Environment Explorer mission, better known as LADEE, impacted the

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What's up @NASAWallops?

NASA Awards the Mid-Atlantic Regional Spaceport III Follow-On Contract

WALLOPS ISLAND — NASA has awarded a contract to the Virginia Commercial Space Flight Authority of Norfolk, Va., for the Mid-Atlantic Regional Spaceport III (MARS III) follow-on contract. The contractor will provide launch site services supporting missions conducted from NASA's Wallops Flight Facility in Wallops Island, Va.

This is a cost-no-fee, fixed-price indefinite delivery/indefinite quantity contract valued at $49 million. The effective ordering period for issuing tasks under the contract began Dec. 8 for five years through Dec. 7, 2019.

Services under the contract will be performed at Wallops and the contractor's off-site facilities.

FOXSI takes flight on a NASA sounding rocket

WALLOPS ISLAND — The Focusing Optics X-ray Solar Imager, or FOXSI, was successfully launched at 2:11 p.m. EST Dec. 11, 2014, on a two-stage NASA Black Brant IX suborbital sounding rocket from the White Sands Missile Range in New Mexico.

Preliminary results show that the payload successfully gathered sun exposures during the maximum time possible. The payload flew to an altitude of 210 miles before descending by parachute to Earth.

For more information on the launch visit the ***news release.***

Technicians install state-of-the-art optics onto the Focusing Optics X-ray Solar Imager, or FOXSI, mission, which will observe hard X-rays from the sun. Photo Credit: NASA

Wallops hosts public information session following Antares mishap

WALLOPS ISLAND — NASA's Wallops Flight Facility conducted a public information session Monday, Dec. 15, at the Wallops Visitor Center to provide updates on environmental remediation work completed and underway following the Antares rocket launch failure in late October.

Some 40 members of the local community attended the event, which featured subject matter experts from Wallops' environmental team, launch range and safety teams.

"I'm very proud of the work by the combined NASA, Orbital and MARS team in the wake of the Antares mishap," said Bill Wrobel, Wallops Flight Facility director. "The team has been working tirelessly to restore and repair the launch site, which is a true national asset, so we can keep moving forward and return to launch."

The Virginia Department of Environmental Quality, Virginia Department of Health, The U.S. Environmental Protection Agency, and other federal and state agencies have provided oversight of the environmental remediation. A complete environmental summary can be found ***here***.

Airborne campaigns tackle Africa, Arctic, climate missions

WALLOPS ISLAND — Three of five new NASA airborne field campaigns will be flown by NASA Wallops' Airborne Science aircraft in 2015.

The studies investigate several incompletely-understood Earth system processes were competitively-selected as part of NASA's Earth Venture-class projects.

"These new investigations address a variety of key scientific questions critical to advancing our understanding of how Earth works," said Jack Kaye, associate director for research in NASA's Earth Science Division in Washington. "These innovative airborne experiments will let us probe inside processes and locations in unprecedented detail that complements what we can do with our fleet of Earth-observing satellites."

NASA Wallops recently received a new acquisition that will play a key role in the scientific investigations: a U.S. Coast Guard HC-130H. The aircraft will fly under the callsign "NASA436" in support of NASA's Airborne Science Program.

"We were excited to see the aircraft touch down at Wallops Flight Facility Dec. 10," said Gerrit Everson, NASA Wallops research and test pilot. "It truly is a beautiful aircraft and we are proud to add it to our inventory!"

The three Earth Venture investigations Wallops will fly are:

• **Ecosystem changes in a warming ocean –** Michael Behrenfeld of Oregon State University in Corvallis, Oregon, will lead the North Atlantic Aerosols and Marine Ecosystems Study, which seeks to improve predictions of how ocean ecosystems would change with ocean warming. The mission will study the annual life cycle of phytoplankton and the impact small airborne particles derived from marine organisms have on climate in the North Atlantic. The large annual phytoplankton bloom in this region may influence the Earth's energy budget. Research flights by NASA's C-130 aircraft from Wallops Flight Facility, Virginia, will be coordinated with a University-National Oceanographic Laboratory System (UNOLS) research vessel. UNOLS, located at the

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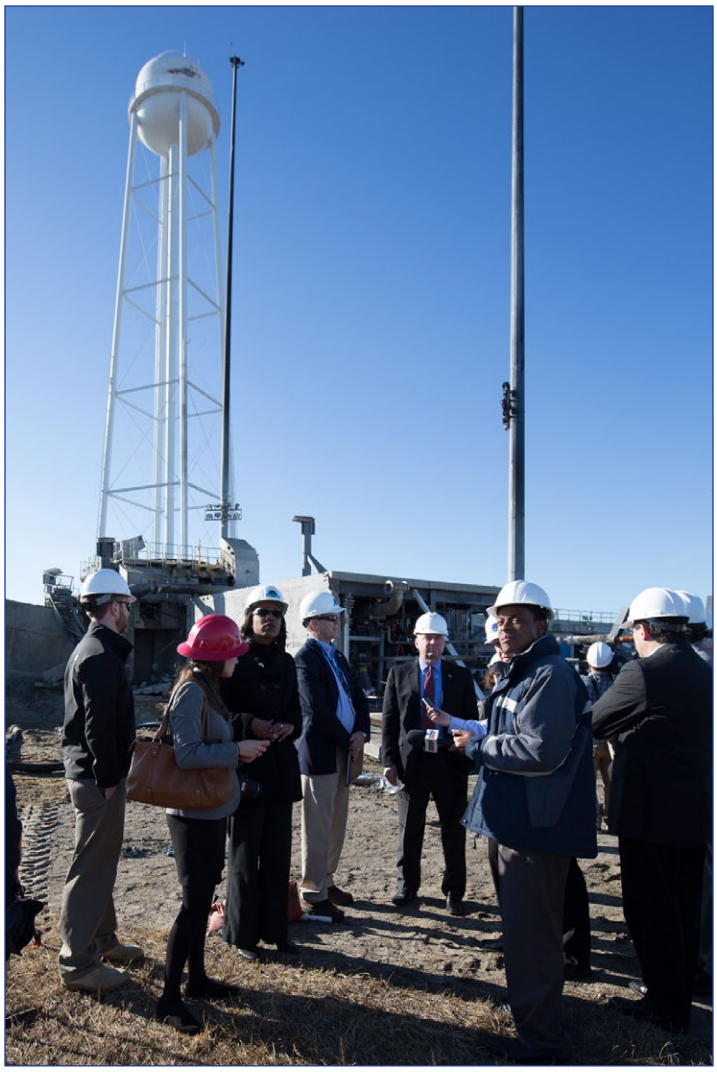
The newest addition to the Wallops Aircraft Office is a new C-130. The aircraft will fly under the callsign "NASA436" in support of NASA's Airborne Science Program. Photo Credit: NASA/Patrick Black

U.S. Senator Tim Kaine is briefed by Dale Nash, Virginia Commercial Space Flight Authority Executive Director, on plans to repair Mid-Atlantic Regional Spaceport Pad 0A following the Antares mishap Oct. 28. Photo Credits: NASA/Jamie Adkins

Virginia Senator Kaine visits Wallops, Pad 0A

WALLOPS ISLAND — U.S. Senator Tim Kaine visited Wallops Flight Facility Wednesday, Dec. 17, where he met with emergency responders from the Wallops Fire Department and Chincoteague Volunteer Fire Department and toured Virginia's Mid-Atlantic Regional Spaceport Pad 0A, receiving an update on pad damage following the Antares mishap in late October. NASA continues to support its partners at the Mid-Atlantic Regional Spaceport and Orbital Sciences as they work to return to launching from Wallops.

Senator Kaine talks with members of the Wallops Fire Department during his visit to the facility Dec. 17.



Above left: Senator Kaine toured the damaged MARS Pad 0A during a visit to the facility Dec. 17. Members of the media along with staff from U.S. Congressman Scott Rigell's office also toured the site. Above right: Dale Nash briefs Senator Kaine on damage seen near Pad 0A. Bottom: Senator Kaine talks to reporters following his tour of the facility. Virginia State Senator Lynwood Lewis and Dale Nash look on.

Rocket dances across the Norway sky

WALLOPS ISLAND — A four-stage NASA Black Brant XII suborbital sounding rocket carrying the Cusp-Region Experiment (C-REX) payload was successfully launched Nov. 24, 2014, from the Andøya Rocket Range in Norway.

The mission marked the first time NASA's B200, stationed at Wallops Flight Facility, was flown intercontinental to support a scientific investigation.

The science team is analyzing the data, including that gathered from ground cameras and cameras in the NASA B200 aircraft of the vapor cloud releases.

"For reasons that are currently not understood, there is a permanent density increase in this part of Earth's thermosphere, which is expected to cause small but important and currently unpredictable perturbations to the orbits of spacecraft flying through it," said Mark Conde, C-REX principal investigator from the University of Alaska, Fairbanks. "By measuring winds and ion motion at multiple locations inside the density enhancement, we hope to understand the flows that are responsible for creating and sustaining it."

C-REX was supported through NASA's Sounding Rocket Program at NASA's Wallops Flight Facility. NASA's Heliophysics Division manages the sounding rocket program.

C-REX lifts off from the Andøya Rocket Range in Norway Nov. 24, 2014. Photo Credits: NASA/Brea Reeves

The Antarctic Impulsive Transient Antenna (ANITA-III) payload undergoes a hang test at the Long Duration Balloon Facility outside of McMurdo Station, Antarctica. ANITA-III successfully launched at 11:27 a.m. EST Dec. 17, the first of three major flights planned for 2014-2015 Antarctic Scientific Balloon Campaign. Photo Credit: NASA/Courtesy

Balloon program preps for another busy year

COSI, SPIDER missions on track

WALLOPS ISLAND — NASA's 2014-2015 Antarctic Scientific Balloon Campaign took to the skies Wednesday, Dec. 17, with the successful launch of the Antarctic Impulsive Transient Antenna (ANITA-III) from the Long Duration Balloon (LDB) facility outside of McMurdo Station, Antarctica.

The NASA zero-pressure balloon lifted the 4,601-pound ANITA-III payload to an operational float altitude of 123,000 feet, or more than 23 miles above the Earth's surface.

"This was an excellent launch in light wind conditions," said Hugo Franco, campaign manager from NASA's Columbia Scientific Balloon Facility. "The balloon performed normally during ascent, and entry into float. Science reports all systems are working properly and have begun calibrations via LOS (line of sight)."

Poor weather conditions scrubbed earlier launch attempts. Now that ANITA-III is airborne, scientists will use its instruments to detect the ultra-high energy cosmogenic neutrino flux, which originates as a result of the integrated ultra-high energy cosmic ray interactions throughout the universe.

"I'm very proud of the crew on-ice for this launch," said Debbie Fairbrother, chief of NASA's Balloon Program Office. "ANITA-III is a very large payload, and the team made the launch operations look easy!"

Dr. Peter Gorham, University of Hawaii at Manoa, is the principal investigator for ANITA-III. A much smaller balloon was launched several hours later as a mission of opportunity with the ANITA High Altitude Calibration (ANITA HiCAL) payload. Dr. David Besson, University of Kansas, is the principal investigator for ANITA HiCAL.

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Brian Campbell senior Earth Science Education and Communication Specialist, takes a selfie with the soil moisture active passive satellite in the background. SMAP is scheduled to launch Jan. 29, 2015. Photo Credit: NASA/Brian Campbell

i am goddard

Brian Campbell

WALLOPS ISLAND — Brian Campbell, Senior Earth Science Education and Communication Specialist in Code 610.W, has been working with middle schools in Maryland and Delaware to beta-test the new SMAP Block Pattern Soil Moisture Protocol as part of The GLOBE Program.

SMAP stands for Soil Moisture Active Passive, and is a NASA satellite mission that will be launched on January 29, 2015 from Vandenberg AFB in California. SMAP is a joint mission between NASA's Jet Propulsion Laboratory and the Goddard Space Flight Center. SMAP will measure soil moisture and surface freeze/thaw from space.

As part of the mission, SMAP and The GLOBE Program have designed a collaboration that will allow students to take soil moisture measurements that will serve as important ground validation for the SMAP spacecraft data.

Mr. Campbell is the lead for the SMAP-GLOBE collaboration and is seeking schools to take these simple soil moisture measurements once the satellite is flying and taking satellite measurements. Those school taking the measurements will also have the chance to talk directly to NASA scientists working on the SMAP mission.

For more information about the SMAP mission, visit the ***Globe.gov website***.

For more information, please email ***Brian Campbell***.

Students test out soil moisture measurement instruments as part of a SMAP outreach program that will also aid ground validation efforts. Photo Credit: Courtesy photo

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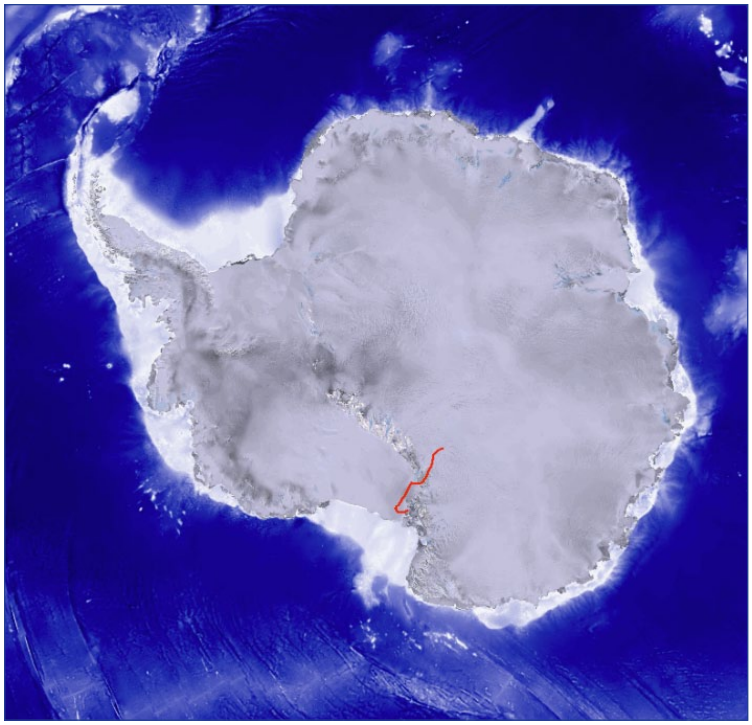
The Compton Spectrometer and Imager (COSI) payload is a gamma-ray telescope designed to study astrophysical sources of nuclear line emission with high spectral and spatial resolution. The experiment is flight ready and the next large payload will be launched from Antarctica. Dr. Steven Boggs, University of California, Berkeley, is the principal investigator.



Groundtrack of the ANITA-III flight over Antarctica as of the morning of Friday, Dec. 19. To track the balloon flight real time, visit the *Flight 657N data page*.

COSI will fly on an 18.8 million-cubic-foot NASA Super Pressure Balloon (SPB), the largest flight of a SPB from Antarctica. Most scientific balloons experience altitude variances based on temperature changes of the balloon lifting gas between day and night. Super Pressure Balloons are the latest in balloon technology, enabling ultra-long duration missions on the order of 100 days or more at constant float altitudes due to the pressurization of the balloon.

"Super pressure balloons are going to be a real game-changer for conducting scientific investigations in the near-space environment," Fairbrother said.

The third flight planned for the 2014-2015 Antarctic Campaign is the Suborbital Polarimeter for Inflation Dust and the Epoch of Reionization (SPIDER). SPIDER is a balloon-borne sub-millimeter polarimeter using large format arrays of cryogenic bolometric detectors to produce high-fidelity images of the southern sky. Dr. William Jones, Princeton University, is the principal investigator. The SPIDER team is finishing preparations to become flight ready.

NASA's Wallops Flight Facility manages the agency's scientific Balloon Program with 10-15 flights each year from launch sites worldwide. The balloons are massive in volume; the average-sized balloon could hold the volume of nearly 200 blimps. Previous work on balloons have contributed to confirming the Big Bang Theory. In addition, balloons have been used to test new technologies, such as the Low-Density Supersonic Decelerator, which will enable NASA to land larger, heavier payloads on Mars.

For more information on NASA's Scientific Balloon Program, visit the ***Code 820 website***.

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University of Rhode Island's Graduate School of Oceanography in Narragansett, Rhode Island, is an organization of 62 academic institutions and national laboratories involved in oceanographic research.

• **Greenhouse gas sources –** Kenneth Davis of Pennsylvania State University in University Park, will lead the Atmospheric Carbon and Transport-America project to quantify the sources of regional carbon dioxide, methane and other gases, and document how weather systems transport these gases in the atmosphere. The research goal is to improve identification and predictions of carbon dioxide and methane sources and sinks using spaceborne, airborne and ground-based data over the eastern United States. Research flights will use NASA's C-130 from Wallops and the UC-12 from Langley Research Center in Hampton, Virginia.

• **African fires and Atlantic clouds –** Jens Redemann of NASA's Ames Research Center in Mountain View, California, will lead the Observations of Aerosols above Clouds and their Interactions project to probe how smoke particles from massive biomass burning in Africa influences cloud cover over the Atlantic. Particles from this seasonal burning that are lofted into the mid-troposphere and transported westward over the southeast Atlantic interact with permanent stratocumulus "climate radiators," which are critical to the regional and global climate system. NASA aircraft, including a Wallops P-3 and an Armstrong ER-2, will be used to conduct the investigation flying out of Walvis Bay, Namibia.

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surface of the moon in the early hours of April 18, as planned. Along with gathering detailed information about the lunar atmosphere's structure, LADEE's Lunar Laser Communication Demonstration made history using a pulsed laser beam to transmit data over the 239,000 miles from the moon to the Earth at a record-breaking download rate of 622 megabits-per-second.

May — Our P-3B returned from Greenland following an 11-week deployment in support of Operation IceBridge. During that time, the P-3B flew a total of 373.9 flight hours, the most ever during a single P-3B mission, covering 100,554 miles. Our P-3B will return in 2015 with a new set of wings to ensure many more years of supporting NASA science to come.

June — We took an enormous NASA scientific balloon, built a new launcher for it, suspended a Star 48B solid-fueled rocket motor attached to a flying-saucer shaped payload, and traveled to Hawaii to test it out. The Low-Density Supersonic Decelerator test flight June 28 was a great success, with Wallops' balloon, range, and safety teams providing critical support for the new technology, which will someday help land larger, heavier payloads on Mars.

July — Orbital successfully launched their second commercial resupply services flight July 13 lifting off from MARS Pad 0A. Three days later, astronauts aboard the International Space Station captured the Cygnus spacecraft, filled with more than 3,300 pounds of supplies, with the station's robotic arm.

August — Results published Aug. 1 from data collected during a sounding rocket mission some 16 months earlier help explain why the sun's outer atmosphere is so much hotter than at its surface. The Extreme Ultraviolet Normal Incidence Spectograph, or EUNIS, payload provided data reinforcing a theory that nanoflares — a constant peppering of impulsive bursts of heating, none of which can be individually detected — provide for the mysterious extra heat.

September — We wrapped up the third and final year of Global Hawk flights supporting the Hurricane and Severe Storm Sentinel mission. Global Hawks will return to Wallops again in 2015 supporting follow-on science investigations.

October — The month started off with an amazing, all-in-one-center scientific balloon mission pairing the Wallops Arc Second Pointer with the Goddard (Greenbelt campus)-built Observatory for Planetary Investigations from the Stratosphere.

Oct. 28 was a most difficult day with the well-publicized Antares failure occurring shortly after lift-off. The outpouring of support since the mishap has been tremendous, and I know we will all come back stronger than ever.

November — Moving forward on a project many years in the making, we broke ground on a new Educator Resource Center. The 2,000-square-foot facility will help advance STEM initiatives in the region.

December — The month wrapped up as busy as any other with our annual holiday part, numerous sounding rocket flights, the arrival of our new C-130, the release of our diversity and inclusion strategic plan, and a visit from U.S. Senator Tim Kaine.

There's more, of course, and any year-in-review list comes with the risk of leaving out other achievements worthy of mention. Please know that all of you play such a critical role in the success of our missions and our facility. Happy Holidays to you and yours—thank you for your dedication and service.

The first Global Hawk arrived at Wallops Flight Facility Aug. 27, 2014. Photo Credit: NASA/Brea Reeves